

THE USE OF VIDEO TECHNOLOGY TO ENHANCE RESEARCHER CAPACITY TO MEET SCIENTIFIC AND MORAL CRITERIA FOR EVALUATION OF DISCURSIVE PSYCHOLOGICAL STUDIES IN EDUCATION.

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Abstract

The purpose of this paper is to justify and reflect upon the way in which video technologies were employed in data generation for a study of student agency in a science classroom using discursive psychology. The research was designed with the purpose of providing new understanding of how students develop a sense of themselves as responsible agents in secondary science classrooms. The study drew upon discursive psychology for this purpose, and attended to the social meaning made relatively determinate in participants' conversations. An instrumental case study was developed from video recordings of a science classroom in action and video-stimulated interviews with the research participants. The scientific and moral criteria for evaluation underlying the research is explained in the paper. Phonological transcripts were generated as the primary data source for the study. The analysis, including the production of the phonological transcripts, is explained and an example of the report is provided to reflect upon the importance of the video technology for meeting the scientific and moral criteria for evaluation of discourse-based research in education. By making the criteria for evaluation explicit and reflecting upon the enhanced capacities of researchers to meet these criteria using video technology, the paper contributes to the theme of the symposium of "researcher practice in the generation of data for educational research using video-based research design".

Introduction

The purpose of this paper is to justify and reflect upon the way in which video technologies were employed in data generation for a study of student agency in a science classroom using discursive psychology. The research was designed with the purpose of providing new understanding of how students develop a sense of themselves as responsible agents in secondary science classrooms. The study drew upon discursive psychology for this purpose, and attended to the social meaning made relatively determinate in participants' conversations. An instrumental case study was developed from video recordings of a science classroom in action and video-stimulated interviews with the research participants. The scientific and moral criteria for evaluation underlying the research is explained in the paper. Phonological transcripts were generated as the primary data source for the study. The analysis, including the production of the phonological transcripts, is explained and an example of the report is provided to reflect upon the importance of the video technology for meeting the scientific and moral criteria for evaluation of discourse-based research in education. By making the criteria for evaluation explicit and reflecting upon the enhanced capacities of researchers to meet these criteria using video technology, the paper contributes to the theme of the symposium of "researcher practice in the generation of data for educational research using video-based research design".

A Summary of the Research

The use of discursive psychology is a new theoretical approach for researching student agency in science education, where cognitive psychology has previously provided the dominant research theory (Arnold, 2012a). The analytic focus in the discursive psychological approach is the psychological locations (positions) that participants take up in their everyday conversations (Davies & Harré, 1990). This focus marks a shift in studies of student agency in science education from hidden mechanisms behind discursive practices, such as individual students' intentions, attitudes or cognitive schema (Sharma, 2007; Basu, 2008; Barton & Tan, 2010), to discursive practices through which students can take themselves up as agentic beings (Davies, 1990).

The study was conducted as an instrumental case (Arnold, forthcoming) and focused on the opportunities of participating students for agentic positioning in science classroom conversations. The group of three girls chosen for the case study were successful science students according to local practices, but seemed to have limited opportunities for agentic positioning in their science classroom. A discursive psychological analysis of the students' conversations was conducted in order to understand how their agentic positioning could be better supported. This focus was also consistent with the aim of the research to improve the balance of agency in science classrooms for all students. Historically, girls have been marginalised in science (Brotman & Moore, 2008).

The main data source required for the study concerned the participants' discourse in and about their science lessons. For this purpose, videotapes of the participants' science lessons for a complete unit of work and the documentation of all of their written work was sought. Supplementary ethnographic information to support analyses of participants' classroom discourse included: documents of the teacher's unit and lesson plans, videotaped pre-unit and post-lesson, video-stimulated interviews with the teacher and videotaped post-lesson video-stimulated interviews with individual students and, the researcher's observations of each lesson. This large data set satisfied the requirements of the study for clear recordings of "naturally occurring" (Wood & Kroger, 2000, p57) participant discourse.

A coding system for participant discourse, based upon grammar that can be used to index a person's sense of responsibility was developed and used for selecting episodes in which the participants indexed responsibility to themselves. The social meaning of their language use was analysed using the positioning triad (Harré & van Langenhove, 1999a). The positioning triad are three interdependent features of a conversation: "positions", the conversational "storyline" and the "actions", including speech-actions, that are said or done, which together make the social meaning of any action relatively determinate. Nine conversational episodes were chosen to exemplify variability in the participants' capacity for agentic positioning. The research was reported using the phonological transcripts of these episodes juxtaposed with the researcher's discursive psychological analysis of the social meaning of the participants' actions.

It was found that the girls' joint action supported their development as collectively agentic but not as personally agentic, and that their collective agency was not recognised by their teacher in the public collective practices of the classroom. A framework for learning design in science classrooms was developed from the findings for addressing the balance of agency in school science (Arnold, 2012b; Arnold, forthcoming).

Criteria for Evaluation

Whilst scientific criteria for judging the integrity of discourse-based approaches to qualitative research have been provided in the literature (for example, Smith & Hodkinson, 2005; Potter & Wetherell, 1987; Wood & Kroger, 2000), there has been a comparative lack of discussion of moral criteria (Wood & Kroger, 2000, p. 177). A discursive psychological approach is consistent with the philosophical position that there is no possibility of theory-free observation and knowledge. As such, any list of criteria will always be rooted in researchers' standpoints and socially constructed. The scientific criteria employed in the research was drawn from the published work of discourse analysts

in social psychology, but the moral criteria was drawn from diverse sources, reflecting the lack of discussion for criteria for evaluation in moral terms.

The scientific criteria included “trustworthiness” and “soundness” (Woods & Kroger, 2000, p. 167). The criteria adopted to elaborate the moral criteria underpinning the research included “privileging persons” (Harré, 1997; Shawver, 2001) and “dialogic interaddressivity” (Matusov, 2011, p. 103). The scientific and moral criteria, which are elaborated below have been separated for clarity in communication, but they are, in practice, interlinked.

Trustworthiness

Claims that research is replicable and generaliseable are not made in discursive studies. Instead, findings should be trustworthy in that they derive from accountable procedures and can be depended upon as a useful way for understanding the participants’ discourse and as a possible basis for understanding other discourse for further work.

A comprehensive research design and the systematic documentation of the stages of data generation undertaken in the analysis contributed to the trustworthiness of the research account. The significance of multiple cameras and audio tracks for the construction of the phonological transcripts in the representation of participants’ discourse and the process of interpretation of social meaning is demonstrated in the excerpt below. The research account was based upon phonological transcripts, provided in recognition that “*readers of discourse analytic studies need to be able, to an important extent, to perform their own evaluations of the analytic conclusions*” (Potter & Wetherell, 1994, cited by Wood & Kroger, 2000, p. 169). The data was presented as participants’ discourse, allowing for transparency of analysis that is not possible using narrative styles of reporting.

Soundness

The scientific criteria of soundness refers to the methodological practices of “demonstration”, “participants’ orientation” and “coherence”. Transparency of analysis is crucial in discourse analysis. Demonstration is a key requirement of warrantability. Demonstration means showing how the interpretations of individual excerpts, as well as the over all claims, are grounded in the text (Wood & Kroger, 2000, p. 170). In discourse analysis, it is important to be able to show that the interpretations have been grounded in the participant’s orientation. The interpretations of the classroom discourse were orientated towards the participants’ agentic positioning by grounding claims in participants’ own grammatical choices and the way in which the participants responded to each other in the negotiation of social meaning at the research site.

A coherent set of claims will account for both the broad, general pattern and the details of individual sequences. A coherent analysis will show the reader “*how the discourse fits together and how the discursive structure produces effects and functions*” (Potter & Wetherell, 1987, p. 170). Coherence was facilitated by the comprehensiveness of the research design and through a focus on variability in the participants’ meaning making during the complete unit of work in science. The patterns in the participants’ discourse that were identified in the analysis account for this variability.

Privileging Persons

Moral criteria for the evaluation of research claims have received a relative lack of discussion (Woods & Kroger, 2000, p. 177) despite being recognised as important. Wood and Kroger state that “*it is incumbent on researchers to assess work in terms of its moral implications and to articulate the criteria on which they do so*” (p. 177). A person-centered methodology was developed in the study that assumed “person-based ethics (Aristotelian)” instead of “action-based ethics (utilitarianism)” (Harré, cited in Shawver, 2001). Under action-based ethics in research, the coding of action could be done without paying attention to its social meaning (Arnold, 2004, p. 56). Privileging persons includes:

1. Refusing to do research that does not track the way individuals behave differently and uniquely, and
2. Acknowledging that we are only capable of seeing the world from our distinct, embodied point of view (Shawver, 2001; Harré, 1997).

This moral position satisfies the sense of duty experienced by the researcher, who was also an educator, to be consciously concerned with the personal development of individual learners.

Harré has been reported as cautioning that *“if we do not privilege... we will lose something precious: our western traditional way of recognising that each person has agency, that is, each person has the ability to initiate action and take responsibility for this action”* (Shawver, 2001).

The ontological stance taken in the study was to privilege the person responsible for action, including speech-action, and the social meaning of their actions, and to look to the conversation as the site of social and psychological construction. This has been achieved by employing an analytical tool and coding system that is person-centred, focusing on the meanings negotiated by particular individuals at the research site, and reporting the data as dialogue.

Dialogic Interaddressivity

Dialogic interaddressivity is a concept developed by Masutov (2011, p. 103), inspired by Bakhtin, implying that a researcher can never fully know the meaning of a text to the research participants. Persons maintain incalculability and this insight captures the researcher's moral orientation to the participants in the study. Therefore, the researcher's interpretations of the participants' discourse was seen as the “fusion of horizons” (Gadamer, 1979); interpretation is as much about the researcher's cultural history as it is about the text representing the cultural history of the three girls upon whom the research gaze was focussed and their joint activity.

Dialogic interaddressivity was acknowledged in the researcher's practices by endeavoring to open up rather than close down dialogic interaction between a reader and the text of the research report. The reporting of the analysis, illustrated in the excerpt below, is an example of “heterodiscoursia” (Masutov, 2011, p. 107, after Bakhtin), meaning that the reader of the report has not been presented with a monologic account, but has been enabled to interact with the participants' voices in the text representing their conversational episodes and the researcher's interpretation of those episodes.

In the next section, the example of the analysis facilitates the researchers' reflections on the use of video technology to meet these criteria. The discussion in the last section elaborates on the moral criteria in light of the dearth of discussion in this area.

The Analysis of Social Meaning Using Discursive Psychology

Discursive psychology is a development of discourse analysis in social psychology (Edwards & Potter, 1992; Harré, 1984; Harré, 1995; Potter & Wetherell, 1987). The ontological commitments of a discourse analytic approach imply a central interest in recordings and records (but not reports) of verbal and nonverbal aspects of discourse in recognition that people and situations can be described in multiple ways (Edwards & Potter, 1992). Reports or descriptions by researchers are inevitably selective and may not capture those features that are relevant to participants (Wood & Kroger, 2000, p. 69). Clear, unbroken recordings of the students' science classroom conversations were required. The International Centre for Classroom Research at the University of Melbourne provided the labour and technical support for high quality video recordings of the science classroom in action that were generated using four video cameras and seven audio tracks.

Phonological transcripts, using conventions developed by conversation analysts (Wood & Kroger,

2000, p. 193, see Appendix), were generated as the main data source. Phonological transcripts differ from conventional orthographic transcripts because, not only are the words that were spoken by participants conveyed, but also the way in which they are uttered. The excerpt from the research report illustrates the way in which the phonological transcripts were used to convey aspects of the focus students' speech-action that would not have been possible without the use of video technology. The phonological transcripts were the main source of data generated for the study, providing detailed and accurate representations of the participants' action. Phonological transcription was necessary because meaning is conveyed in the way words are said and what is done, and not just by what is said. In the phonological transcripts, the sounds of the participants' verbal actions were represented as words, quazi words and symbols. Non-verbal actions were represented as descriptions. The following features were marked: overlapping and latched speech, pauses, intonation, pronunciation, laughter, audible in and out takes of breath, the relative length of sounds and the relative speed of utterances. Descriptions of non-verbal action from the video recordings were included in the transcripts when they were deemed necessary for the analysis of social meaning. Care was taken with descriptions to avoid interpretation.

Generation of data and analysis were concurrent and overlapping processes. Repeated viewing of the videos was necessary to ensure the accuracy and completeness of the transcripts. In the initial "reading" (Wood & Kroger, p. 87), and viewing, the specific focus and appropriate sections for analysis were identified. Relevant episodes consisted of verbal action that contributed to conversations in which the participating students or their teacher participated. Whilst this was unproblematic with respect to the interview transcripts, repeated viewing of the lesson videos was necessary because in a classroom there can be multiple speakers, concurrent conversations and who was speaking and to whom was not always obvious from the audio recordings and the words alone. The identification of speakers was facilitated by the capacity for cross-referencing using the four classroom videos, as has been illustrated elsewhere (Arnold, 2010). For example, the Teacher Camera may not have captured a student speaker during a whole-class conversation. However the video recorded by the Whole Class Camera could be used to identify a student speaker.

Excerpt from The Research Report - The Tissue

In the episode that this excerpt is taken from, the girls observe the phenomenon that air in an upturned cup prevents water from entering the cup and find the explanation of this phenomenon problematic. Illustrated in this episode are two social contexts relevant to the participants' science classroom discourse: individually realised acts (self conversation or thoughts) and the collective space of the small group conversation. The pseudonyms, Kesar and Tasha are used for the participating students.

This episode illustrates Kesar's sense of what is part of the joint activity and what is not. There is a marked difference in the episode between Kesar's individually realised acts and those acts published in the collective space of the science classroom. Kesar's sense of her duty within the collective space is evident in her reflexive repositioning (not illustrated in the excerpt here, see Arnold, 2012b). Kesar's reflexive repositioning is accepted by Tasha and potential storylines of collaborative dialogue do not eventuate.

The episode took place during a practical activity in lesson one. The group had completed the instructions on a handout, reproduced below:

Crumple a tissue and fit it tightly into the bottom of a glass. Push the glass, mouth down, into a large container of water until most of the glass is under water. Pull the glass out of the water and check whether the tissue is wet. [Handout, lesson 1].

The purpose of this experiment was to illustrate a general property of gases that "gases take up space" [Teacher, post-lesson interview lesson 1; lesson 2]. Air, a gas, took up space and prevented water from

entering into the cup. The tissue remaining dry even though the cup was submerged in water provided an observable phenomenon. The questions on the handout that the girls were addressing in the episode were:

(A) *What do you observe?*

(B) *Write an inference to explain your observations.*

The conversation took place after the girls had each written the observation that the tissue stayed dry and had begun to address question (B) above. In her first two turns, Tasha indexed her responsibility using the indicative mood in asking a question and providing a hypothesis as to why the tissue stayed dry. By flagging her hypothesis as incomplete (“somehow”) and laughing, she reduced the reliability of her hypothesis and positioned the other group members as responsible for evaluating it or for participating in co-constructing an explanation. This positioning is consistent with the possible storyline: ‘Students as Responsible for Providing Explanations in Collaborative Dialogue’.

Tasha: Yeah (.) so how does it work (.) the air goes into the cup and (.) what?

Kesar: <Um>=

Tasha: =>and the tissue somehow stops it< heh

Kesar: And let's- I want to do that again just to observe it I- [Picks up the cup and places it upside down in the tub of water.]

Tasha: Can we do that again? °Please°. [Looks around the room, locating the box of tissues.]

Kesar: [Picks up cup]. Do we need- [pushes the cup upside down into the tub of water without the tissue] °ah yeah (.) we probably didn't.°

Kesar responded to Tasha's appeal, her actions revealing that she was unable to provide a satisfactory explanation. However, instead of commenting upon Tasha's hypothesis and engaging in collaborative dialogue, Kesar took personal responsibility for working out the right answer to the question on the handout. In Kesar's second turn, she indexed her sense of personal agency using the first person and by describing her psychological state as “wanting”. She acted according to her expression of desire by immediately picking up the cup and placing it into the water without the tissue. She did this without waiting for approval from Tasha or the other group members. Her use of the first person in saying, “I want to do that again” was marked because it was not in alignment with the sense of shared obligation to perform the experiment usually expressed by the group members, for example, Tasha's appeal to the group in, “Can we do that again? Please”.

In the last turn, Kesar spoke quietly, her utterances were incomplete and were not directed to an audience. In individually realised acts, she repositioned herself as responsible by forming her question and resolving her own inquiry. Kesar's question, “Do we need- [the tissue]“, was a different question from Tasha's initial question about the role of the tissue. Kesar's talk revealed the sense she was making of her observations including her evaluation that the tissue was probably not necessary. Her actions, from expressing her desire to resolving her inquiry, align with Dewey's theory of inquiry as a creative need-desire-inquiry-satisfaction cycle that results in learning.

Discussion and Conclusions

In discursive psychology, the complex psychology arising from our embodiment as individual beings, and our location as a person amongst other persons in the social world is acknowledged. “The thesis of double location” (Harré & van Langenhove, 1999b) posits that people have two kinds of identity:

1. Social identity: what it is to be and to be seen to be, a certain kind of person, produced by what people say and do.
2. Personal identity: what it is to be one and the same individual through a life course, produced by a sense of bodily continuity in time and space (Muhlhäusler & Harré 1990, p. 100).

Often, social identity is referred to as the “multiplicity of selfhood” because people belong to many “communities of practice” (Wenger 1996) and employ a variety of social identities in their competent management of everyday life, and personal identity can be referred to as the “singularity of selfhood” because one’s sense of self is relatively stable over the course of one’s life (Harré & van Langenhove 1999b). In the study, “personhood” and “selfhood” were used by way of distinction between these two kinds of identity.

The term “person” is used in discursive psychology to refer to an individual’s location as an embodied being, embedded in the social world amongst other persons and imbued with a relative sense of responsibility and duty. The criterion, “privileging persons”, refers to the discursive practice of indexing responsibility to a person or group of persons embedded in a local moral order. One’s personhood is the cluster of positions that a person has the capacity to occupy in social interaction, whereas one’s personal identity, is “*the leading concept of a theory a person has about him/herself*” (Harré & van Langenhove, 1999b, p. 71). Other researchers have shown that stories of the self can be told in multiple ways for different purposes (Bamberg, 2008). “*A person has several and changing representations of him/herself centered on the theoretical concept of a personal unity*” (Harré & van Langenhove, 1999b, p. 71). It is therefore seen as important, in discursive psychology, to consider the social meaning or function of biographical stories in conversation. As illustrated in the excerpt above, video recording of action in the social world enhances the researcher’s capacity to privilege the participants as “persons” because, the participants’ actions in the social world can be slowed down, replayed, and understood in terms of both verbal and non-verbal cues, enabling the analysis of the relative determinate social meaning of participants’ action to be interpreted.

The social meaning of participants’ action, as interpreted by the researcher was made explicit in the reporting of the research, as illustrated above. This was facilitated by the generation of phonological transcripts. As discussed, phonological transcription was made possible using video technology and, in particular, the reliability of the transcripts were enhanced due to the provision for multiple concurrent recordings of the classroom from cameras placed in four strategic locations in the classroom according to the research design. In the analysis, the researcher grounded the interpretations in the participants’ orientations by way of marking the participants’ use of grammar. The accurate representation of participant’s language use in the context of their situated discourse, facilitated by high quality video recordings, provided for the reader the means to evaluate the soundness of the research. Hence, the researcher’s capacity to address the criterion, “dialogic interaddressivity”, was enhanced through the video-based research design.

It must be recognised that the moral criteria of “privileging persons” and “dialogic interaddressivity” elaborated by this researcher may not comprehensively satisfy the standpoints of researchers with different analytic foci, and that other researchers have posited different views, for example, Tracey suggested the criteria: a) “helpful problem framing”, in which the problems of practice are formulated at an appropriate level of abstraction and ideas about how to act are suggested; b) “research practitioner problem solving” is explicated; and c) “situated ideals” are formulated, in which the participants’ solutions are incorporated and normative principals are suggested (Tracey, 1995, see Wood & Kroger, 2000, p. 177). The reflection provided in this paper upon the capacity for addressing criteria for evaluating discourse-based studies in education using one study of student agency in a science classroom as illustrative should promote much needed discussion about the use of video-based research design in educational research and the enhanced capacities facilitated by video technology for researchers to meet their own (socially constructed) lists of characteristics for warranting their claims.

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Appendix

Phonological Transcription Conventions

Adapted from the system developed by Jefferson (Woods & Kroger 2000, p193).

LESSON 3 [24:26-28:52]	Extract headings refer to the segment of the lesson shown in the transcript. It includes the lesson number and an interval corresponding to minutes from the start of the lesson.
some Ytalk/ ≤overlap <i>f</i>	Square brackets between lines bracketing two lines of talk indicate the onset and end of overlapping talk
end of line= =start of line	Equal signs indicate latching between utterances.
(.)	Untimed pause
(1.2)	Times pause to the nearest tenth of a second
bu-	A dash shows a sharp cut off of speech
Under; pie	Underlining indicates emphasis
CAPITALS	Capital letters indicate talk that is noticeably louder than surrounding talk
°soft°	Degree signs indicate talk that is noticeably more quiet than surrounding talk
>fast< <slow>	Less-than and greater-than signs indicate talk that is noticeably faster or slower than the surrounding talk
ho:me	A colon indicate an extension of the sound or syllable that it follows
□rising □falling	Upward and downward pointing arrows indicate marked rising and falling shifts in intonation in the talk immediately following
. , ? !	Punctuation marks are used to mark speech delivery rather than grammar. A period indicates a stopping fall in tone; a comma indicates a continuing intonation; a question mark indicates a rising inflection; an exclamation mark indicates an animated or emphatic tone.
wghord	“gh” within a word indicates guttural pronunciation
heh or hah	Indicate laughter
.hh	Audible inbreath
hh	Audible outbreath (sometimes associated with laughter).
Rilly	Modified spelling is used to suggest pronunciation
(word)	Transcriber's guess at unclear material
()	Unclear speech or noise
[talks while writing]	Brackets enclose contextual information
...	Horizontal ellipses indicate talk omitted from the data segment
. .	Vertical ellipses indicate intervening turns omitted from the data segment
□	A horizontal arrow in the left margin points to an utterance discussed in the text

Repeated symbols indicate, for example:

:::	greater elongation
oo	more quiet
hhhh	longer outbreath